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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,390	06/28/2005	Taishi Tsuji	Q83773	5831

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WASHINGTON, DC 20037

EXAMINER
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NELSON, MICHAEL E

ART UNIT	PAPER NUMBER
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4174

MAIL DATE	DELIVERY MODE
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10/17/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/509,390	<b>Applicant(s)</b> TSUJI ET AL.	
	<b>Examiner</b> Michael E. Nelson	<b>Art Unit</b> 4174	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 September 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 6-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>09/27/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of group 1 in the reply filed on 09/20/2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

The requirement is still deemed proper and is therefore made FINAL.

### *Specification*

2. The disclosure is objected to because of the following informalities:
3. On page 2, line 2, "EL **divide**" should be corrected to "EL **device**."
4. On page 3, the phrase "in the layer adjacent cathode of the light emitting layer" is unclear. From the neighboring text, it appears that Applicant intends "in the layer adjacent **to the** cathode **side** of the light emitting layer."
5. On page 4, the second paragraph, Applicant states "an EL device capable of prolonging the life." It appears from the text that Applicant intends "capable of prolonging the **lifetime of the device**"
6. On page 5, the first paragraph, the last line reads, "between the anode and the hole transportation." It is clear from the text that Applicant intends "between the anode and the hole transportation **layer**."
7. On page 46, on the second line, "material XT emitting red **phosphorous**" should be corrected to "material XT emitting red **phosphorescence**."

Art Unit: 4174

8. On page 49, the first word of the second paragraph, **Fore** should be corrected to **For**.
9. Appropriate correction is required.

### ***Claim Objections***

10. Claims 4-5 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. Since claim 3 is a proper multiple dependent claim, but claim 4 is also a multiple dependent claim dependent upon claim 3, and therefore improper. Claim 5, being dependent upon improper multiple dependent claim 4 is also improper. See MPEP § 608.01(n). Accordingly, the claims 4-5 have not been further treated on the merits.

### ***Claim Rejections - 35 USC § 103***

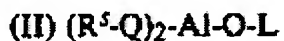
11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

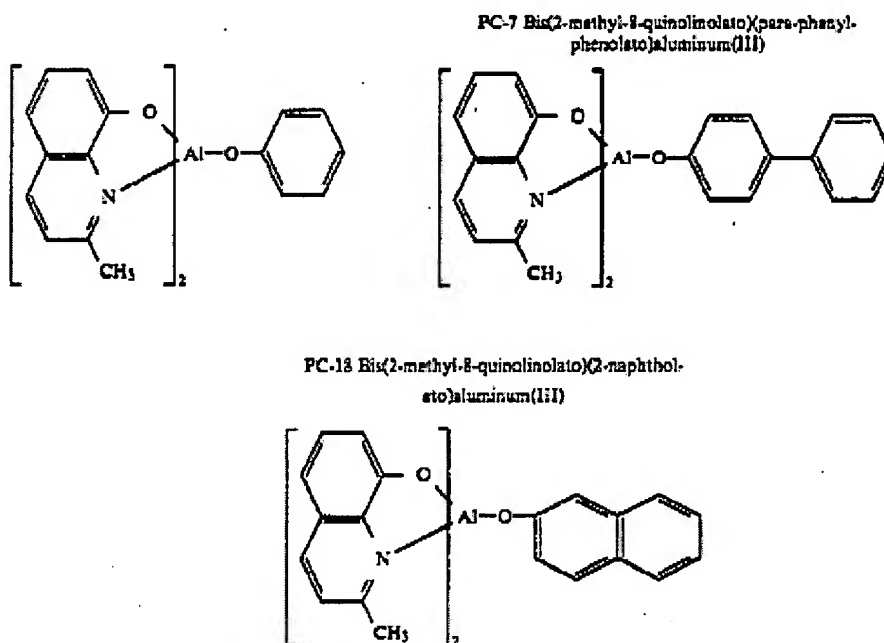
12. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Slyke et al. (5,150,006) in view of Shunk et al. (Journal of the American Chemical Society, v. 71, no.12, December 1949).

Art Unit: 4174

13. Concerning claim 14, Van Slyke et al. describe an electroluminescent device comprised of material with the following structure, where Q represents a substituted 8-quinolinolato ligand, R<sup>5</sup> represents a substituent on the 8-quinolinolato ligand, O-L is a phenolato ligand, and L is a hydrocarbon of 6-24 carbon atoms. (column 8, lines 16-28)



14. Van Slyke et al. discloses the following specific examples (columns 12, 13, and 15).

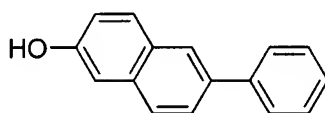


15. Van Slyke et al. further disclose that the compounds are derived from HO-L phenols, where L is a hydrocarbon of from 6-24 carbon atoms comprised of a phenyl moiety. (column 9, lines 10-12). Furthermore, they report that there is little advantage to be gained with very large ligands, but that ligands with up to 18 aromatic ring carbons have revealed high levels of stability, and therefore the preferred ligands have between 7 and 18 total carbon atoms. (column 9, lines 18-24) Van Slyke et al. clearly describe

Art Unit: 4174

compounds with a naphthalene ring (as shown in the third structure above) as the first ring of the phenolic ligand, and also describe compounds with a phenyl substituent pendant off of the first ring of the phenolic ligand (shown in the second structure above). Van Slyke et al. are silent on the use of the specific phenyl substituted naphthalene ligand shown below.

16. Shunk et al. disclose the synthesis of a substituted phenolic compound with the following structure.



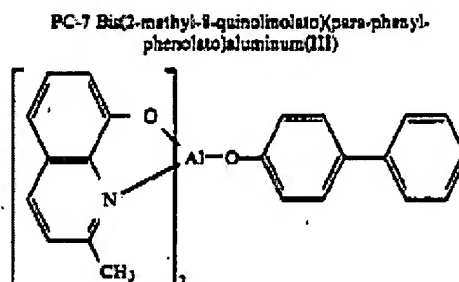
17. Based on the general teaching by Van Slyke et al. that the ligand should contain from 7-18 carbons (this ligand has 16 carbons), and the fact that larger ligands exhibit higher stability, and the fact that the precursor phenolic compound is known in the literature, it would have been obvious to one of ordinary skill in the art to synthesize the structure shown below with the intent of improving stability by increasing the size of the phenolate ligand.

18. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haase et al. (6,791,258) in view of Van Slyke et al. (5,150,006) and further in view of Shunk et al. (Journal of the American Chemical Society, v. 71, no.12, December 1949).

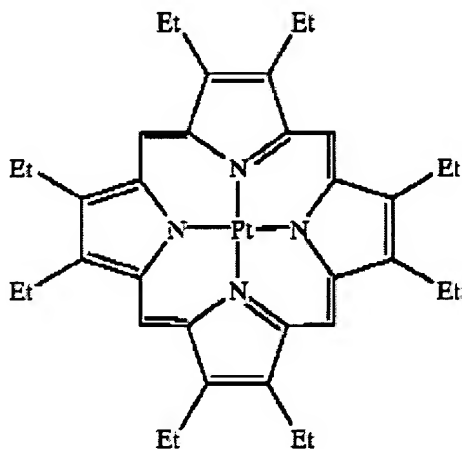
19. Concerning claims 1-3, Haase et al. describe the production of a multicolor electroluminescent device comprising parts from Fig. 2 and column 4, lines 1-26, including an anode (42), a hole injection layer (46), hole transport layer (48), an electron

Art Unit: 4174

transport layer (50), an electron injection layer (52) and a cathode (54), where the electron transport layer is comprised of BA1q (shown below), and where the electron



transport layer also serves as the host for a dopant, depending on the desired color, specifically the phosphorescent platinum octaethylporphyrin (PtOEP) (shown below). (column 4, line 49). Haase et al. further discloses that a second electron transport layer (not shown) may be deposited over a doped electron transport layer to improve electron injection (column 4, lines 61-64). Haase et al. are silent on the use of the specific aluminum complex as the host compound.



20. Van Slyke et al. (with support by Shunk et al.) teach that the specific aluminum complex is an obvious variant of the aluminum complexes reported by Van Slyke et al.

Art Unit: 4174

as discussed above. Therefore, it would have been obvious to one of ordinary skill in the art to utilize the compound envisaged by Van Slyke et al. in an electroluminescent device as described by Haase et al. since the compound would be predicted to have improved stability (as discussed above) and function in the same manner.

21. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (6,303,238) in view of in view of Van Slyke et al. (5,150,006) and further in view of Shunk et al. (Journal of the American Chemical Society, v. 71, no.12, December 1949). And Baldo et al. (Physical Review B, v. 62, no. 16, pp. 10958-10966, Oct. 2000).

22. Concerning claim 1-3, Thompson et al. describes an electroluminescent device comprised of an anode, a hole transporting layer, an electron transporting layer and a cathode layer, where the emissive layer is between the electron transporting layer and the hole transport layer (claim 41), where the emissive layer comprises a charge carrying host material and a phosphorescent material (claim 26), where the phosphorescent material is platinum octaethylporphine (claim 18). The charge transporting host material is an electron transport material (claim 31): Thompson et al. are silent on the use of the specific phenolato aluminum complexes as the host material for the electroluminescent device. Thompson et al. further disclose that a hole injection layer may be present between the anode layer and the hole transport layer, and that an electron injection layer may be present between the cathode and the electron transport layer. (column 10, lines 1-5)



Art Unit: 4174

23. Van Slyke et al. (with support by Shunk et al.) teach that the specific aluminum complex is an obvious variant of the aluminum complexes reported by Van Slyke et al. as discussed above. Furthermore, Van Slyke et al. teach that the aluminum compounds are electron transporting compounds (column 8, lines 8-10), produce blue electroluminescence (title, abstract, Table 1) and also serve as hosts for fluorescent dopants (column 17, lines 45-48).

24. Baldo et al. teach the nature of energy transfer between host compounds and phosphorescent dopants, and discuss the effect of the difference in triplet energy between the host and the guest material (section IV). In such, they disclose that when the difference between the triplet energy of the host and the dopant is large, then triplets are strongly confined on the guest, and therefore phosphorescence efficiency is high, since triplets are not lost back to the host material. Furthermore, in cases where the energy of the guest is less than the host, but not by a large amount (Baldo et al. specifically disclose PtOEP doped in Alq<sub>3</sub>) that significant populations of both guest and host triplets are present. Therefore, a greater difference in triplet energy between the host and the guest compounds results in an increase in phosphorescence efficiency.

25. While the triplet energy of the phenolato aluminum complexes are not specifically disclosed, they can be inferred, relative to Alq<sub>3</sub>. The phenolato aluminum compounds are known blue fluorescence emitters, therefore the energy difference between the HOMO and LUMO state is greater than the energy difference between the HOMO and LUMO state of the green emitting Alq<sub>3</sub>. As a result, it would be reasonable to predict

Art Unit: 4174

that the triplet energy of the phenolate aluminum compounds would be greater than the triplet energy of Alq<sub>3</sub>.

26. Since the triplet energy of the phenolato aluminum compounds is greater than the triplet energy of Alq<sub>3</sub> (as discussed above), and also electron transport materials (as discussed above), based on the teaching by Baldo et al. that a greater difference between the triplet energy of the host material and the triplet energy of the guest results in an increase in phosphorescence efficiency, it would have been obvious to one of ordinary skill in the art to use the phenolato aluminum compound envisioned by Van Slyke in an electroluminescent device described by Thompson et al. for the purpose of improving phosphorescence efficiency.

### ***Double Patenting***

27. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

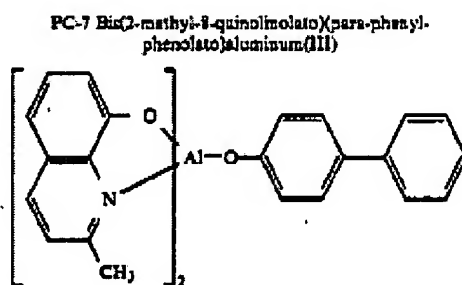
A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Art Unit: 4174

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

28. Claims 1-3 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 3,5,11,12,15 of copending Application No. 10/282244 in view of Van Slyke et al. (5,150,006).

29. Application No. 10/202244 claims an electroluminescent device with an anode, cathode, a hole transport layer, a light emitting layer, and an electron transport layer, where the light emitting layer comprises an organic host material and a phosphorescent guest, where the difference in ionization energy between the host and hole transport layer is 0.4-0.8 eV, and the host is an aluminum chelate compound (claim 3), specifically the following structure (claim 5). Where the device further comprises a hole injection layer (claim 11), or an electron injection layer (claim 12), and the phosphorescent guest is a platinum porphine compound (claim 15).

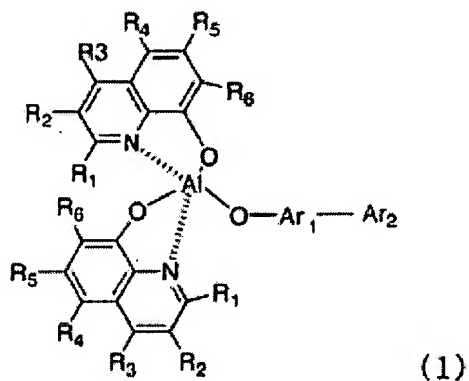


30. Since the instant application is not limited to with regards to the difference in the ionization potential between the host compound and the hole transport compound, and since the compound claimed in the instant application is an obvious variant the compound shown above in view of Van Slyke et al. (as discussed above), the scope of the claims overlaps.

Art Unit: 4174

This is a provisional obviousness-type double patenting rejection.

31. Claims 1-3, and 14 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3 and 8 of copending Application No. 10/566725. Although the conflicting claims are not identical, they are not patentably distinct from each other because Application No. 10/566725 claims an aluminum chelate complex for an electroluminescence element with the following structure, with a specific purity limitation (claim 1) where Ar<sub>1</sub> is either naphthylene or phenylene and Ar<sub>2</sub> is either naphthyl or phenyl (claim 2), and the total number of aromatic rings is 2 or 3 (claim 3). The application also claims an electroluminescent element with an emissive layer comprised of the compound as a host, with a phosphorescent dopant including platinum complexes.



32. Since the above compound encompasses the compound claimed in the instant application (claim 14), which is not limited based on purity, and since the electroluminescent element claimed above includes all of the limitations of the instant application, the scope of the claims from the two applications overlap.

Art Unit: 4174

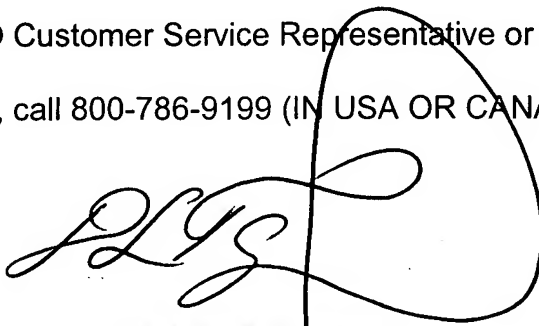
This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael E. Nelson whose telephone number is 571-270-3453. The examiner can normally be reached on M-F 7:30am-5:00pm EST (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**D. LAWRENCE TARAZANO**  
**PRIMARY EXAMINER**

Michael E. Nelson

Application/Control Number: 10/509,390

Page 13

Art Unit: 4174

Examiner  
Art Unit 4174